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SUBJECT OF INVESTIGATION

(6) GENETIC ANALYSIS OF MICROORGANISM BY MIXED INFECTION OF ACTIVE PHAGE PARTICLES AND PHAGE OR BACTERIAL DNA,

RESPONSIBLE INVESTIGATOR

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In the previous experiment, it could be known that S. gallinarum doubly infected with active phage a_{10s} particles and purified DNA extracted from phage a_1 could yield a few recombinant type phage between a_{10s} and a_1 besides a majority of normal a_{10s} progeny phages.

In this case it must be mentioned that phage a_{10s} is unrelated with a_1, the donner phage of DNA sample, so that there are no probability of occurance of such recombinant type phage from the double infection of a_{10s} and also active a_1 phage particles, if any, survived in DNA sample.

On the other hand, among such newly obtained recombinant type phages there some particles endowed with the ability of lysogenic conversion of salmonella O(I) antigen which is one of genetic character of a_1, the donnor phage of DNA, but not of phage a_{10s}.

My chief research required in this Contract is the genetic and chemical analysis of the genetic factor concerning the lysogenic conversion of salmonella O(I) antigen by mixed infection method of active other phage particles and DNA sample extracted and purified from phage a_1.

Before setting forth research on this line, I believe, it will be more fruitful in future experiment to clarify much more genetic markers of a_1 phage, the donnor of DNA, and a_{10s} phage or more precise relationship between both phages.

On this viewpoint, I have just started my research by the study on the analysis of another genetic character of phage a_1: the host controlled variation observed in this phage cultured through one of its sensitive host bacteria.

Here is summerized the results of experiments carried out during the past two months.

1) The phage a_1 cultured by Sg, one of strain of Salmonella gallinarum--a_1(Sg)--forms plaque on indicator Sg in good efficiency of plating, e.o.p., but can not form plaque in such a good e.o.p. on indicator S_4S, one of the delysogenized strain of S. typhimurium S_4.

The proportion of plaques on S_4S formed by a_1(Sg) to those of the same phage on Sg is about $10^{-5.505}$.

2) On the other hand, the phage a_1 cultured by S_4S-a_1(S_4S)-can forms plaque on S_4S almost in the same good efficiency as well as on Sg.

3) This restricted phage a_1(Sg), however, can also adsorb to indicator S_4S but in a little lower rate than that to Sg. Its K value, velocity constant of adsorption to indicator S_4S and Sg are 4.7 X 10-10ml/min and 2 X 10^{-10}ml/min respectively.

4) Whether DNA of a_1(Sg) phage is or is not injected into S_4S cell will be a future problem. However, it seems to

occur also in this case since at least 5 minutes after adsorption of $a_1(Sg)$ onto S_4S the superinfection of $a_1(S_4S)$ is mutually excluded.

5) The analyses of the fate of DNA of $a_1(Sg)$ injected into S_4S will be carried on by several methods.

Of course the mixed infection of S_4S with DNA extracted from $a_1(Sg)$ and active phage particles of $a_1(S_4S)$ will be attempted.